

HISTORICAL WATER SUSTAINABILITY: A CASE STUDY OF THE PHAD IRRIGATION SYSTEM OF MAHARASHTRA STATE, INDIA

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Sustainable PHAD (Block) Irrigation System in India

In the North – West part of Maharashtra, there are a number of community managed small scale irrigation schemes in the Tapi basin. These are popularly known as "Phad Systems"



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Historical evidences of sustainable irrigation systems in India

- Community managed traditional sustainable irrigation systems are found all over India.
- In the fourth century (BC) Chanakya the author of "Arthshastra (Economics)" reported that assistance were given to farmers to manage irrigation system.
- In Tamil Nadu the Chola King Karikala built annicut on the River Cauvery in first century (BC).
- Vijay Nagar Empire of Karnataka State constructed diversion weirs and canals during 13-16th Century.



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History of PHAD Irrigation system

- Rich historical tradition of community managed sustainable irrigation systems in India.
- Some of these systems are so old that it is impossible to establish their antiquity.
- Phad irrigation system has been in practice since the time of Mouryas rule over Khandesh (NW Maharashtra)(300 BC).
- Phad system received patronage in the tenure of kings of Yadavas (around 1000 years back)
- Queen Ahilyabai Holkar strengthened this system in the 18th Century.



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Historical evidences of sustainable irrigation systems in India

- Himachal Pradesh had an ancient system called "Kuhl".
- In the hilly regions of Uttar Pradesh, Haryana and Rajasthan also tradition of farmers managing diversion streams "Johads" was found.
- Community managed irrigation systems "Ahar Pyne" in Bihar and "Apatani" in Arunachal Pradesh.
- In Maharashtra traditional sustainable community managed "Phad System" and "Malgujari Tank System" existed for last 300 to 400 years ago.



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Different components of The PHAD system

WEIR (BANDHARA)

Number of Weirs and Area Irrigated:

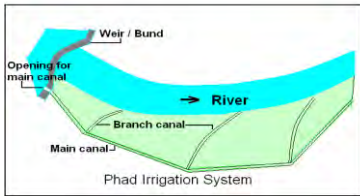
Sr. No	River	District	No. of Weirs	Command Area (Ha)
1	Pangra	Dhule	30	3594
2	Mosam	Nashik	20	1500
3	Aram	Nashik	08	275
4	Girna	Nashik	08	200
Total			66	5569



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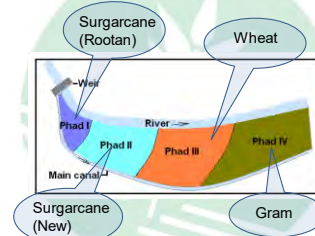
Canals

The length of these canals varies from 2 km to 12 km:



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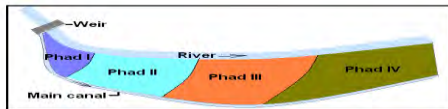
Crop Rotation in PHAD



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Number of PHADs (Blocks)

- The Irrigated command is usually divided into 4 blocks called Phads.
- The size of a phad can vary from 10 ha to 300 ha, the average being 100ha-125 ha.
- Each Phad has varied number of beneficiaries.
- Division and size of phads depends on topography and physical boundaries viz. natural depression, nallas(rivers), roads, etc.
- Common layout of the phads is given below:



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Management in the PHAD

- The PHAD system of irrigation is entirely managed by the community
- Every village has an effective system of management.
- A village level committee is formed by the irrigators.
- **Functions of Committee:**
 - Protect, supervise, and administer the irrigation system.
 - Employ Supervisors, Canal Inspectors and Water Guards for irrigation.
 - Solve disputes and impose fine on the offenders.
 - Decide the cropping pattern
 - Decide sequence of irrigation of the fields in a Phad.
 - Call an annual general body meeting.

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Cropping System

Year	Phad I	Phad II	Phad III	Phad IV
I	Sugarcane (Ratoon)	Sugarcane (New)	Wheat	Gram
II	Gram	Sugarcane (Ratoon)	Sugarcane (New)	Wheat
III	Wheat	Gram	Sugarcane (Ratoon)	Sugarcane (New)
IV	Sugarcane (New)	Wheat	Gram	Sugarcane (Ratoon)

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Functions of Irrigators

- Elect the committee members and decide the chair person.
- Maintain the field channels and distributaries.
- The operations like tillage, sowing, removing weeds from the fields, applying fertilizers, applying pesticides and harvesting are to be done by the irrigators.
- Take only that type of crop which is decided by the committee.

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Relevance of PHAD Irrigation system in the 21st century



- Community Managed Irrigation System
- Collective Maintenance
- Equity
- Sustainability
- Flexibility
- Conservation of land

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FEEDBACK



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Conclusions



- Phad System is the best historical example of the community managed sustainable irrigation system.
- Phad irrigation system can be set as a good example of equitable distribution of available water and its proper management.
- The Phad system shows that small farmers can organize themselves and can promote a sustainable irrigation system.
- Crops are rotated from one Phad to another, so that land neither gets water logged nor gets saline.

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Conclusions



- Water distribution practice and the management rules are so framed that they sustain for a long period.
- Phad irrigation system has relevance even today for providing predictable, reliable and equitable water to farming community for maintaining sustainability in agriculture.
- The farmers share, both prosperity and distress equitably.
- Up-gradation and modernization is needed under changing environment.

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